

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2004/050043

International filing date (day/month/year)
22.12.2004

Priority date (day/month/year)
22.12.2003

International Patent Classification (IPC) or both national classification and IPC
B01J19/12, C10B53/00, C10B19/00

Applicant
CAMBRIDGE UNIVERSITY TECHNICAL...

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl
Fax: +31 70 340 - 3016

Authorized Officer

Telephone No. +31 70 340-



Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-33
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-33
Industrial applicability (IA)	Yes: Claims	1-33
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

PCT/GB2004/050043

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following document:
D1: Ludlow-Palafox, C. and Chase, H. A., "Microwave-induced pyrolysis of plastic wastes", Industrial & Engineering Chemistry Research, 40 (2001), 4749-4756
2. The present application does not meet the requirements of Article 33(1) PCT, because the subject-matter of claims 1-33 does not involve an inventive step in the sense of Article 33(3) PCT in view of document D1.
- 2.1 The document D1 is regarded as being the closest prior art and discloses a semibatch microwave induced pyrolysis system for recycling an aluminium/polymer laminates (toothpaste tubing). The reactor (2) comprises a stirrer (3), a carbon bed, a gas condensing system (6-10) and means for feeding the material (4).

The subject-matter of independent claims 1 and 21 mainly differs from D1 in that the reactor comprises two chambers, each provided with a stirrer and an exit.

- 2.2 The problem underlying the invention can be seen as to provide an economically viable method and reactor for continuously recycling metal/organic laminates that is operable on a commercial scale (see page 1, last paragraph).

Providing the apparatus of D1 with an exit is obvious for the skilled person because a continuous process requires an exit to be present. When the skilled person is confronted with the scaling up from bench scale to commercial scale, he is aware that the total volume of the reactor has to be increased; the provision of an additional chamber equipped with a stirrer is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed.

The subject-matter of independent claims 1 and 21 lacks therefore an inventive step and it does not fulfill the requirements of Article 33(3) PCT.

- 2.3 Dependent claims 2-20 and 22-33 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step with respect to the prior art named in the present proceedings.

The reasons therefor are that the additional features of the said claims are either directly known from document D1, or is a combination of features obvious to the man skilled in the art in consideration of the disclosure of the prior art named in the present proceedings, or they concern only minor modifications which lie within the normal practice of the man skilled in the art.

Re Item VII

Certain defects in the international application

- 7.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the document reflecting the prior art described on page 1, lines 17-27 is not identified in the description.
- 7.2 Contrary to the requirements of Rule 6.2(b) PCT, the features of the claims are not provided with reference signs placed in parentheses.

Re Item VIII

Certain observations on the international application

- 8.1 The features in the apparatus claims 24-26 and 33 relate to a method of using the apparatus rather than clearly defining the apparatus in terms of its technical features. The intended limitations are therefore not clear from this claim, contrary to the requirements of Article 6 PCT.
- 8.2 The feature "wherein said second rotary stirrer...is so configured as to fluidise the mixture..." of claims 1 and 21 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features

necessary for achieving this result, i.e. shape of the blade.